Tiffany, Bruce

From: Tiffany, Bruce
Sent: Wednesday, July 26, 2006 6:07 PM
To: Renaud, Rick; Stern, Jeff
Subject: KCIA June 2006 Stormwater Vault Sediment Results
Attachments: KCIA_June2006_SW_Vault_Sed_Data.xls

Rick and Jeff;

Here are the results from the June 2006 sampling of the KCIA stormwater vaults.

One interesting thing to note is that the biomarker coprostanol was detected at Vault 1541 and Vault 1640.

Bruce

Table 1
King County International Airport - Stormwater Vault Sediment Results - Dry Weight Values

	1541 KCIA L39363-1	1640 KCIA L39363-2	1650 KCIA L39363-3	1657 KCIA L39363-4	1670 KCIA L39363-5	1680 KCIA L39363-6	1680(FD) KCIA L39361-10	1756 KCIA L39363-7	1757[a] KCIA L39363-8	1757[b] KCIA L39396-1
Date Sampled	6/8/2006	6/7/2006	6/7/2006	6/7/2006	6/6/2006	6/6/2006	6/6/2006	6/6/2006	6/6/2006	6/6/2006
TOC (percent)	8.65	7.2	6.98	3.98	6.27	6.59	-	5.27	8.27	0.45
Metals (mg/kg DW)										
As	**9.4**	**23**	**34.4**	**14**	**9.3**	**29.3**	-	**12**	**16**	4 U
Cu	**1,550**	**233**	**567**	**204**	**227**	**284**	-	**285**	**301**	**31**
Pb	**190**	**463**	**744**	**263**	**396**	**420**	-	**237**	**385**	**10**
Hg	**0.13**	**0.21**	**0.24**	**0.20**	**0.30**	**0.24**	-	**0.54**	**0.24**	0.04 U
Zn	**1,880**	**1,250**	**1,810**	**1,620**	**574**	**1,240**	-	**1,580**	**813**	**40**
LPAH (µg/kg DW)										
Acenaphthene	820 U	1,100 U	1,600 U	870 U	**1,000**	1,500 U	-	1,600 U	1,300 U	49 U
Acenaphthylene	1,800 U	2,300 U	3,500 U	1,900 U	1,300 U	3,300 U	-	3,500 U	2,800 U	100 U
Anthracene	470 U	**1,200**	**990**	**840**	**4,170**	**1,910**	-	**4,390**	**6,360**	**63**
Fluorene	1,500 U	2,000 U	3,000 U	1,600 U	**1,700**	2,900 U	-	3,000 U	2,400 U	90 U
2-Methylnaphthalene	1,600 U	2,200 U	3,300 U	1,700 U	1,200 U	3,100 U	-	3,300 U	2,600 U	97 U
Naphthalene	1,600 U	2,200 U	3,300 U	1,700 U	1,200 U	3,100 U	-	3,300 U	2,600 U	97 U
Phenanthrene	**3,260**	**13,700**	**6,980**	**6,580**	**20,900**	**19,100**	-	**33,700**	**47,200**	**703**
Total LPAH	**3,260**	**14,900**	**7,970**	**7,420**	**27,770**	**21,010**	-	**38,090**	**53,560**	**766**
HPAH (µg/kg DW)										
Benzo(a)anthracene	**2,230**	**7,160**	**4,530**	**3,730**	**19,600**	**11,600**	-	**30,800**	**35,500**	**495**
Benzo(a)pyrene	**2,770**	**11,500**	**7,150**	**6,240**	**26,100**	**19,000**	-	**42,600**	**50,000**	**741**
Benzo(b)fluoranthene	**4,520**	**20,500**	**10,000**	**10,400**	**40,700**	**30,500**	-	**77,800**	**83,200**	**1,310**
Benzo(k)fluoranthene	**3,280**	**13,900**	**10,600**	**9,910**	**26,700**	**30,400**	-	**58,200**	**58,900**	**861**
Benzo(g,h,i)perylene	**3,140**	**11,900**	**7,270**	**6,610**	**25,000**	**20,300**	-	**42,600**	**44,800**	**736**
Chrysene	**4,690**	**18,900**	**10,800**	**9,970**	**32,200**	**31,300**	-	**67,300**	**70,100**	**1,010**
Dibenzo(a,h)anthracene	820 U	**3,100**	**2,300**	**1,600**	**7,480**	**4,050**	-	**10,400**	**12,900**	**184**
Fluoranthene	**7,420**	**33,600**	**18,000**	**17,100**	**52,500**	**53,300**	-	**106,000**	**132,000**	**1,910**
Indeno(1,2,3-cd)pyrene	**2,570**	**10,300**	**6,570**	**5,810**	**23,300**	**18,200**	-	**40,200**	**42,500**	**684**
Pyrene	**6,770**	**26,000**	**14,100**	**12,800**	**44,500**	**38,500**	-	**76,600**	**100,000**	**1,450**
Total HPAH	**37,390**	**156,860**	**91,320**	**84,170**	**298,080**	**257,150**	-	**552,500**	**629,900**	**9,381**
Phthalates (µg/kg DW)										
Bis(2-ethylhexyl)phthalate	**53,100**	**73,200**	**31,600**	**29,400**	**39,000**	**64,300**	-	**56,900**	**232,000**	**63,900**
Butylbenzylphthalate	700 U	**2,040**	**3,130**	**1,490**	**2,610**	**3,040**	-	**3,510**	**4,090**	**115**
Diethylphthalate	700 U	930 U	1,400 U	750 U	510 U	1,300 U	-	1,400 U	1,100 U	42 U
Dimethylphthalate	1,300 U	1,700 U	2,600 U	1,400 U	930 U	2,400 U	-	2,600 U	2,100 U	76 U
Di-n-butylphthalate	590 U	780 U	**3,150**	**710**	420 U	**2,810**	-	1,200 U	930 U	35 U
Di-n-octylphthalate	940 U	1,200 U	1,900 U	990 U	680 U	1,800 U	-	1,900 U	1,500 U	**110**
PCBs (µg/kg DW)										
Aroclor 1016	40 U	51 U	73 U	40 U	31 U	71 U	70 U	80 U	60 U	22 U
Aroclor 1221	40 U	51 U	73 U	40 U	31 U	71 U	70 U	80 U	60 U	22 U
Aroclor 1232	40 U	51 U	73 U	40 U	31 U	71 U	70 U	80 U	60 U	22 U
Aroclor 1242	40 U	51 U	73 U	40 U	31 U	71 U	70 U	80 U	60 U	22 U
Aroclor 1248	40 U	51 U	**248**	**71**	31 U	**725**	**795**	80 U	**97**	22 U
Aroclor 1254	40 U	**152**	**203**	**75**	**115**	**1,040**	**1,150**	**274**	**328**	22 U
Aroclor 1260	40 U	**100**	**266**	**97**	**172**	**157**	**163**	**265**	**332**	22 U
Total PCBs	ND	**252**	**717**	**243**	**287**	**1,922**	**2,108**	**539**	**757**	ND
TPH (mg/kg)										
Diesel	**11,000**	**16,000**	ND	**940**	**2,000**	**2,100**	-	**8,100**	**6,300**	**1,600**
Motor Oil	**81,000**	**8,800**	**10,000**	**3,500**	**8,500**	**8,200**	-	**25,000**	**13,000**	ND

Notes:
Detected values shown in **bold**.
(a) = Sample collected from the middle chamber of vault. Sediment sample appeared normal.
(b) = Sample collected from the last (outflow) chamber of vault. Sediment sample appeared to be a greyish-colored slurry.
FD = Field duplicate
ND = Not detected
U = Chemical not detected at reported concentration.

Table 2
King County International Airport - Stormwater Vault Sediment Results - Comparison to Sediment Management Standards

	SQS	CSL	1541 KCIA L39363-1	1640 KCIA L39363-2	1650 KCIA L39363-3	1657 KCIA L39363-4	1670 KCIA L39363-5	1680 KCIA L39363-6	1756 KCIA L39363-7	1757[a] KCIA L39363-8	1757[b] KCIA L39396-1
Date Sampled			6/8/2006	6/7/2006	6/7/2006	6/7/2006	6/6/2006	6/6/2006	6/6/2006	6/6/2006	6/6/2006
TOC (percent)			8.65	7.2	6.98	3.98	6.27	6.59	5.27	8.27	0.45
Metals (mg/kg DW)											
As	57	93	**9.4**	**23**	**34.4**	**14**	**9.3**	**29.3**	**12**	**16**	4 U
Cu	390	390	**1,550**	**233**	**567**	**204**	**227**	**284**	**286**	**301**	**31**
Pb	450	530	**190**	**463**	**744**	**263**	**396**	**420**	**237**	**385**	**10**
Hg	0.41	0.59	**0.13**	**0.21**	**0.24**	**0.20**	**0.30**	**0.24**	**0.54**	**0.24**	0.04 U
Zn	410	960	**1,880**	**1,250**	**1,810**	**1,620**	**574**	**1,240**	**1,580**	**813**	**40**
LPAH (mg/kg OC)											
Acenaphthene	16	57	9 U	15 U	23 U	22 U	**16**	23 U	30 U	16 U	11 U
Acenaphthylene	66	66	21 U	32 U	50 U	48 U	21 U	50 U	66 U	34 U	22 U
Anthracene	220	1,200	5 U	**17**	**14**	**21**	**67**	**29**	**83**	**77**	**14**
Fluorene	23	79	17 U	28 U	43 U	40 U	**27**	44 U	57 U	29 U	20 U
2-Methylnaphthalene	38	64	18 U	31 U	47 U	43 U	19 U	47 U	63 U	31 U	22 U
Naphthalene	99	170	18 U	31 U	47 U	43 U	19 U	47 U	63 U	31 U	22 U
Phenanthrene	100	480	**38**	**190**	**100**	**165**	**333**	**290**	**639**	**571**	**156**
Total LPAH	370	780	**38**	**207**	**114**	**186**	**443**	**319**	**723**	**648**	**170**
HPAH (mg/kg OC)											
Benzo(a)anthracene	110	270	**26**	**99**	**65**	**94**	**313**	**176**	**584**	**429**	**110**
Benzo(a)pyrene	99	210	**32**	**160**	**102**	**157**	**416**	**288**	**808**	**605**	**164**
Benzo(b)fluoranthene [c]	230	450	**52**	**285**	**143**	**261**	**649**	**463**	**1,476**	**1,006**	**290**
Benzo(k)fluoranthene	-	-	**38**	**193**	**152**	**249**	**426**	**461**	**1,104**	**712**	**191**
Benzo(g,h,i)perylene	31	78	**36**	**165**	**104**	**166**	**399**	**308**	**808**	**542**	**163**
Chrysene	110	460	**54**	**263**	**155**	**251**	**514**	**475**	**1,277**	**848**	**224**
Dibenzo(a,h)anthracene	12	33	9 U	**43**	**33**	**40**	**119**	**61**	**197**	**156**	**41**
Fluoranthene	160	1,200	**86**	**467**	**258**	**430**	**837**	**809**	**2,011**	**1,596**	**424**
Indeno(1,2,3-cd)pyrene	34	88	**30**	**143**	**94**	**146**	**372**	**276**	**763**	**514**	**152**
Pyrene	1,000	1,400	**78**	**361**	**202**	**322**	**710**	**584**	**1,454**	**1,209**	**322**
Total HPAH	960	5,300	**432**	**2,179**	**1,308**	**2,115**	**4,754**	**3,902**	**10,484**	**7,617**	**2,080**
Phthalates (mg/kg OC)											
Bis(2-ethylhexyl)phthalate	47	78	**614**	**1,017**	**453**	**739**	**622**	**976**	**1,080**	**2,805**	**14,169**
Butylbenzylphthalate	4.9	64	8 U	**28**	**45**	**37**	**42**	**46**	**67**	**49**	**25**
Diethylphthalate	61	110	8 U	13 U	20 U	19 U	8 U	20 U	27 U	13 U	9 U
Dimethylphthalate	53	53	15 U	24 U	37 U	35 U	15 U	36 U	49 U	25 U	17 U
Di-n-butylphthalate	220	1,700	7 U	11 U	**45**	**18**	7 U	**43**	23 U	11 U	8 U
Di-n-octylphthalate	58	4,500	11 U	17 U	27 U	25 U	11 U	27 U	36 U	18 U	**24**
PCBs (mg/kg OC)											
Aroclor 1016	-	-	0.5 U	0.7 U	1.0 U	1.0 U	0.5 U	1.1 U	1.5 U	0.7 U	4.9 U
Aroclor 1221	-	-	0.5 U	0.7 U	1.0 U	1.0 U	0.5 U	1.1 U	1.5 U	0.7 U	4.9 U
Aroclor 1232	-	-	0.5 U	0.7 U	1.0 U	1.0 U	0.5 U	1.1 U	1.5 U	0.7 U	4.9 U
Aroclor 1242	-	-	0.5 U	0.7 U	1.0 U	1.0 U	0.5 U	1.1 U	1.5 U	0.7 U	4.9 U
Aroclor 1248	-	-	0.5 U	0.7 U	**3.6**	**1.8**	0.5 U	**11.0**	1.5 U	**1.2**	4.9 U
Aroclor 1254	-	-	0.5 U	**2.1**	**2.9**	**1.9**	**1.8**	**15.8**	**5.2**	**4.0**	4.9 U
Aroclor 1260	-	-	0.5 U	**1.4**	**3.8**	**2.4**	**2.7**	**2.4**	**5.0**	**4.0**	4.9 U
Total PCBs	12	65	ND	**3.5**	**10.3**	**6.1**	**4.6**	**29.2**	**10.2**	**9.2**	ND
TPH (mg/kg)	***MTCA A***										
Diesel		2,000	**11,000**	**16,000**	ND	**940**	**2,000**	**2,100**	**8,100**	**6,300**	**1,600**
Motor Oil		2,000	**81,000**	**8,800**	**10,000**	**3,500**	**8,500**	**8,200**	**25,000**	**13,000**	ND

Notes: Detected values shown in **bold**.

(a) = Sample collected from the middle chamber of vault. Sediment sample appeared normal.
(b) = Sample collected from the last (outflow) chamber of vault. Sediment sample appeared to be a greyish-colored slu
(c) = Standard based on total benzofluoranthenes
ND = Not detected
U = Chemical not detected at reported concentration.
= Exceeds Sediment Quality Standards (SQS).
= Exceeds Cleanup Screening Levels (CSL) or MTCA Method A soil cleanup level for industrial use.